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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/745,705	12/21/2000	Lawrence D. Wong	42390P9859	9709

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EXAMINER

VU, HUNG K

ART UNIT PAPER NUMBER

2811

DATE MAILED: 02/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/745,705

Applicant(s)

WONG, LAWRENCE D.

Examiner

Hung K. Vu

Art Unit

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**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 11-23 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group II, Claims 1-10 and 24, in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Applicant's election without traverse of Group II, Claims 1-10 and 24, in Paper No. 6 is acknowledged.

Claims 11-23 and 25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 9.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-4, 6-8, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin (PN 6,297,554).

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Lin discloses a process comprising,

Forming a first dielectric layer (60) on a substrate (52,54,not shown);

Patterning the first dielectric layer such that a plurality of vertically oriented posts (60) are formed, the post having a top surface;

Forming a second dielectric layer (82) over and adjacent to the posts, the second dielectric layer having a top surface;

Polishing the second dielectric layer such that its top surface is substantially even with the top surfaces of the posts. Note Figures 1-8 of Lin.

With regard to claim 2, Lin discloses the substrate comprises a dielectric material.

With regard to claim 3, Lin discloses the substrate is a material selected from the group consisting of silicon carbide, silicon nitride, and carbon doped oxides of silicon.

With regard to claim 4, Lin discloses the process further comprising curing the second dielectric layer.

With regard to claim 6, Lin discloses the process further comprising forming dual damascene openings in the second dielectric layer.

With regard to claim 7, Lin discloses forming the first dielectric layer comprises depositing an oxide of silicon.

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With regard to claim 8, Lin discloses forming the second dielectric layer comprises chemical vapor deposition of a low-k material.

With regard to claim 10, Lin discloses the second dielectric has a lower dielectric constant than the first dielectric.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 9, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (PN 6,297,554) in view of Cho et al. (PN 6,140,252).

With regard to claim 5, Lin discloses all of the claimed limitations except the process further comprising aging the second dielectric layer. However, Cho et al. discloses a process comprising forming a dielectric layer (28) and aging the dielectric layer. Note Figure 1D and Col. 5, lines 27-32, of Cho et al.. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to form and age the dielectric layer, such as taught by Cho et al. in order to remove the solvent from the pores.

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With regard to claim 9, Lin discloses all of the claimed limitations except forming the second dielectric layer comprises spinning on a low-k material. However, Cho et al. discloses a process of forming a dielectric layer (28) comprises spinning on a low-k material. Note Figure 1D and Col. 5, lines 6-26 of Cho et al.. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to form the second dielectric layer of Lin comprises spinning on a low-k material, such as taught by Cho et al. in order to improve the gaps filling between the structures.

With regard to claim 24, Lin discloses a process comprising,

- Depositing a silicon nitride layer (54) on a wafer (not shown);

- Depositing an insulating layer (60) over the silicon nitride layer;

- Patterning the insulating layer such that a plurality of structures are formed, the structures each having a top surface;

- Depositing a dielectric material (82) over and adjacent to the structure;

- Polishing the dielectric material such that a top surface thereof is substantially even with the top surfaces of the structures. Note Figures 1-8 of Lin.

Lin does not disclose the dielectric material is a porous dielectric material. However, Cho et al. discloses forming a porous dielectric material (28) having a void fraction and treating the porous dielectric material. Note Figure 1D and Col. 3, line 5 – Col. 6, line 5 of Cho et al.. Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to form the dielectric material of Lin as a porous dielectric material, such as taught by Cho

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et al. in order to further decrease the capacitive coupling or crosstalk between the conductors and to increased the void fraction.

### *Conclusion*

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-5:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

February 20, 2002

Steven Loh